IN THE CLAIMS:

This listing of claims will replace all prior versions, and listing, of claims in the application.

Listing of the Claims:

1. (Currently amended) A method for the automated analysis of a digital image comprising an array of pixels, including the steps of using a computer or processor for:

identifying certain pixels to exclude from the following step, consequent upon a local property of such pixels;

generating a property co-occurrence matrix (PCM) from pixels not identified to be excluded by the preceding step, using the properties of local mean and local standard deviation of intensity in neighbourhoods of the included pixels; and

segmenting the image by labelling the pixels which are included in the formation of said PCM as belonging to specified classes consequent upon analysis of said PCM and by labeling pixels which are excluded from the formation of said PCM as belonging to a specified class different from the first-mentioned classes.

2. (Original) A method according to claim 1 wherein respective Gaussian distributions are fitted to the two main distributions within the PCM using an implementation of the Expectation Maximisation (EM) algorithm to determine the distribution parameters.

3. (Previously presented) A method according to claim 1 wherein pixels are labelled in accordance with a distribution within the PCM to which they are closest and including the steps of:

assigning a respective label to separate distributions within the PCM;

determining the normalised distance between the point within the PCM to which the respective pixel contributes and the centre of each labelled distribution; and

assigning to the respective pixel the label of the distribution for which such normalised distance is the shortest.

4-5. (Cancelled)

6. (Previously presented) A method according to claim 1 wherein the step of identifying pixels to exclude from the formation of said PCM comprises:

forming a grey level histogram from some or all of the image pixels;

establishing a threshold consequent upon analysis of said histogram; and

excluding from the formation of said PCM those pixels which are above said threshold.

7. (Cancelled)

8. (Previously presented) A method according to claim 1 wherein the step of identifying pixels to exclude from the formation of said PCM comprises:

generating a property co-occurrence matrix (PCM) from the image pixels, using the properties of local mean and local standard deviation of intensity in neighbourhoods of the respective pixels and having a higher resolution than the first-mentioned PCM;

forming a histogram of the local mean by summing along constant local mean for a small range of local standard deviation;

establishing a threshold consequent upon analysis of said histogram; and

excluding from the formation of the first-mentioned PCM those pixels which are above said threshold.

9-11. (Cancelled)

12. (Previously presented) A method according to claim 1 further comprising the steps of grouping into blobs contiguous pixels labelled as belonging to the same one of any said class, calculating statistics concerning respective said blobs and filtering the same in accordance with said statistics.

13-15. (Cancelled)

16. (Previously presented) A method according to claim 12 wherein said filtering comprises relabelling the pixels in selected blobs as belonging to a new class different from any aforesaid class.

17. (Original) A method according to claim 16 further comprising the step of dilating by a specified amount blobs composed of pixels relabelled as belonging to said new class (Cn) into adjacent blobs composed of pixels labelled as belonging to a selected one of the first-mentioned specified classes (Co).

18. (Original) A method according to claim 17 wherein said dilation comprises the steps of:

creating a new image by assigning pixels of class Cn in the original image to a value of 1 in the new image and assigning all other pixels to 0;

convolving the new image with a two-dimensional Gaussian kernel having a zero mean and a standard deviation set equal to said specified amount and such that the value of the Gaussian is 1 at 1 standard deviation from the mean;

truncating the resultant image so that it contains only the values 1 and 0; and

if a pixel has a value of 1 in the truncated image and is labelled as either class Cn or class Co in the original image, assigning it to class Cn in the original image.

19. (Original) A method according to claim 17 wherein said dilation comprises repeatedly performing the steps of:

creating a new image by assigning pixels of class Cn in the original image to a value of 1 in the new image and assigning all other pixels to 0;

convolving the new image with a two-dimensional Gaussian kernal having a zero mean and a standard deviation set to a predetermined value (L) and such that the value of the Gaussian is 1 at 1 standard deviation from the mean;

truncating the resultant image so that it contains only the values 1 and 0; and

if a pixel has a value of 1 in the truncated image and is labelled as either class Cn or class Co in the original image, assigning it to class Cn in the original image;

whereby said specified amount of dilation is achieved notwithstanding the presence of gaps of not more than L-1 pixels labelled as belonging to a class neither Co nor Cn between said blobs composed of pixels labelled as belonging to class Cn and said blobs composed of pixels labelled as belonging to class Co.

20. (Cancelled)

21. (Previously presented) A method according to claim 17 further comprising the step of calculating a metric being the ratio of the number of pixels labelled as class Cn after said dilation to the sum of the number of pixels labelled as class Cn and the number of pixels labelled as class Co.

22. (Previously presented) A method according to claim 1 for the automated analysis of a digital image of a section of breast tissue or other histological or cytology specimen.

23. (Cancelled)

24. (Previously presented) A method according to claim 22 wherein a result of said segmentation is to label selected pixels as belonging to the class of epithelial cells.

25. (Previously presented) A method according to claim 16 wherein said image is an image of a section of breast tissue or other histological or cytology specimen and wherein said new class is identified as the class of duct cells.

26. (Previously presented) A method according to claim 17 wherein said image is an image of a section of breast tissue or other histological or cytology specimen and wherein class Cn is identified as the class of duct cells and class Co is identified as the class of epithelial cells.

27. (Original) A method according to claim 26 wherein said dilation is over a distance corresponding to a specified number of epithelial cells.

28-29. (Cancelled)

30. (Currently amended) A method for the automated analysis of a digital image of a physical specimen comprising an array of pixels, comprising the steps of using a computer or processor for:

segmenting the image by labelling respective pixels as belonging to one of two or more classes;

grouping contiguous pixels of the same class into blobs;

calculating statistics concerning respective said blobs;

relabelling the pixels in selected said blobs as belonging to a different said class;

dilating selected blobs of one said class into blobs of another said class by a specified amount;

calculating a metric which relates the total area covered by the dilated blobs to the total area covered by blobs of a selected class or classes; and

providing an indication of the condition of said specimen on the basis of said metric.

31. (Currently amended) A method for the automated analysis of a digital image of a histological specimen of breast tissue comprising an array of pixels, comprising the steps of using a computer or processor for:

labelling pixels as representing epithelial cells and duct cells respectively;

dilating groups of pixels labelled as representing duct cells into adjacent groups of pixels labelled as representing epithelial cells by a specified amount related to the size of an epithelial cell;

calculating the total number of pixels labelled as representing duct cells after such dilation and the total number of pixels labelled as representing duct cells or epithelial cells;

calculating a metric from the calculations in the preceding step; and

providing an indication of a grade of cancer on the basis of said metric.

32-33. (Cancelled)

34. (Currently amended) A ~~computer comprising a~~ computer program located on a tangible computer readable medium ~~comprising~~ including instructions to cause ~~the~~ a computer to execute a method ~~according to claim 1~~ for the automated analysis of a digital image comprising an arry of pixels comprising the steps of:

identifying certain pixels to exclude from the following step, consequent upon a local property of such pixels;

generating a property co-occurrence matrix (PCM) from pixels not identified to be excluded by the preceding step, using the properties of local mean and local standard deviation of intensity in neighbourhoods of the included pixels; and

segmenting the image by labelling the pixels which are included in the formation of said PCM as belonging to specified classes consequent upon analysis of said PCM and by labeling pixels which are excluded from the formation of said PCM as belonging to a specified class different from the first-mentioned classes.